

Glossary

Acronyms

AA	Atomic absorption
AASHTO	American Association of State Highway and Transportation Officials
ACGIH	American Conference of Governmental Industrial Hygienists
ACE	U.S. Army Corps of Engineers (EPA terminology)
ACE	Assistant Chief of Engineers
ACS	American Chemical Society
A-E	Architect - Engineer
AES	Atomic emission spectroscopy
AF	Air Force
AFB	Air Force Base
AL	Action level
ALARA	As low as reasonably achievable
amu	Atomic mass units
ANSI	American National Standards Institute
AOAC	Association of Official Analytical Chemists
AOC	Area of concern
APA	Air pathway analysis
APC	Air pollution control
ARAR	Applicable, or relevant and appropriate requirements
ASAP	Adaptive Sampling and Analysis Plan
ASE	Accelerated solvent extraction
ASQC	American Society for Quality Control
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AVO	Aromatic volatile organics
AWQC	Ambient water quality criteria
BACT	Best available control technology
BAT	Best available technology
BDAT	Best demonstrated available technology
BFB	Bromofluorobenzene
BIF	Boilers and industrial furnaces
BNA	Base, neutral, acids (semivolatile organics)
BNA	Bureau of National Affairs
BOD	Biological oxygen demand
BOE	Bureau of Explosives
BP	Boiling point
BRA	Baseline risk assessment
BRAC	Base Realignment and Closure
BTEX	Benzene, toluene, ethylbenzene, and xylene
CA	Corrective action
CAA	Clean Air Act
CAAA	Clean Air Act amendments
CADD	Computer aided design and drafting
CAMU	Corrective action management unit

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CAS	Chemical Abstract Service
CATV	Corrective action treatment unit
CBD	Commerce Business Daily
CCB	Continuing calibration blank
CCC	Calibration check compound
CCQC	Contractor Chemical Quality Control
CCV	Continuing calibration verification
CD	Consent decree
CDAP	Chemical Data Acquisition Plan
CDC	Centers for Disease Control
CDQAR	Contractor Data Quality Assessment Report
CDQM	Chemical data quality management
CEFMS	Corps of Engineers Financial Management System
CEGS	U.S. Army Corps of Engineers Guide Specification
CEM	Continuous emission monitors
CERCLA	Comprehensive Environmental Response, Compensation, Liability Act
CERCLIS	CERCLA Information System
CF	Calibration factor
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
CGM	Combustible gas meter
CHMM	Certified Hazardous Material Manager
CL	Confidence level
CLP	Contract Laboratory Program
CMA	Chemical Manufacturers Association
CME	Central mine equipment (sampler)
CMECC	California Military Environmental Coordination Committee
CMI	Corrective Measures Implementation
CMS	Corrective Measures Studies
CNAEL	Committee on National Accreditation of Environmental Laboratories
CO	Contracting Officer
COC	Chain of custody
COC	Contaminants of concern
COD	Chemical oxygen demand
COE	U.S. Army Corps of Engineers
COELT	U.S. Army Corps of Engineers loading tool
COLIWASA	Composite liquid waste sampler
CPT	Cone penetrometer testing
CQAR	Chemical Quality Assurance Report
CQC	Contractor quality control
CRADA	Cooperative research and development agreements
CRDL	Contractor-required detection limit
CRP	Community Relations Plan
CRQL	Contractor-required quantitation limit
CRREL	Cold Regions Research and Environmental Laboratory
CRT	Cathode ray tube
CSCT	Consortium for Site Characterization Technologies
CSM	Conceptual site model
CSR	Constant sampling rate

CV (COV)	Coefficient of variation
CVAA	Cold vapor atomic absorption
CWA	Clean Water Act
CX	Center of Expertise
DCB	Decachlorobiphenyl
DCQAP	Data Collection Quality Assurance Plan
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DEEMS	Department of Energy Environmental Management Electronic Data Deliverable Master Specification
DEIS	Draft Environmental Impact Statement
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DFTPP	Decafluorotriphenylphosphate
DL	Detection limit
DMP	Data Management Plan
DNAPL	Dense non-aqueous phase liquid
DNB	Dinitrobenzene
DNT	Dinitrotoluene
DO	Dissolved oxygen
DOD	Department of Defense
DOI	Department of Interior
DOE	Department of Energy
DOT	Department of Transportation
DPM	Defense priority model
DQI	Data quality indicator
DQO	Data quality objective
DRE	Destruction and removal efficiency
DTW	Depth to water
DWPL	Drinking Water Priority List
EA	Endangerment assessment
EB	Equipment blank
ECD	Electron capture detector
EDF	Environmental Defense Fund
EDD	Electronic data deliverable
EE/CA	Engineering evaluation/cost analysis
EHS	Extremely hazardous substances
EHW	Extremely hazardous waste
EIA	Enzyme immunoassay
EICP	Extracted ion current profile
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELCD	Electrolytic conductivity detector
EM	Engineer manual
EMC	Emission Measurement Center
EO	Executive Order
EO	Explosive ordnance
EOD	Explosive ordnance disposal

EP	Engineer pamphlet
EP Tox	Extraction procedure toxicity
EPA	U.S. Environmental Protection Agency
EQL	Estimated quantitation limit
ER	Engineer regulation
ESC	Expedited Site Characterization
ESTCP	Environmental Security Technology Certification Program
ETL	Engineer technical letter
eV	Electron volt
FAR	Field analytical result
FAR	Federal Acquisition Regulation
FDE	Findings and determination of eligibility
FEMA	Federal Emergency Management Agency
FFA	Federal facility agreement
FFMS	Fixed-fenceline measurement system
FFP	Firm fixed price
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FID	Flame ionization detector
FLAA	Flame atomic absorption
FN	False negative
FP	False positive
FP	Flashpoint
FR	Federal Register
FRTR	Federal Remediation Technologies Roundtable
FS	Feasibility study
FSP	Field Sampling Plan
FTIR	Fourier transformed infrared (spectroscopy)
FUDS	Formerly used defense site
FY	Fiscal year
GAC	Granulated activated carbon
GALP	Good automated laboratory practices
GAO	Government Accounting Office
GC	Gas chromatograph or gas chromatography
GC/MS	Gas chromatograph/mass spectrometer
GFAA	Graphite furnace atomic absorption
GIS	Geographic Information System
GLP	Good laboratory practices
GPC	Gel permeation column (chromatography)
GPM	Gallons per minute
GPR	Ground penetrating radar
HAP	Hazardous air pollutant
HAZCAT	Hazardous characterization (testing)
HAZMAT	Hazardous materials
HAZWRAP	Hazardous Waste Remedial Program
HDPE	High density polyethylene
HE	High explosive
HECD	Hall electrolytic conductivity detector
HM	Hazardous material
HMX	Cyclotetramethylenetetranitramine (Her majesty's explosive)

HPLC	High performance liquid chromatography
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HRGC	High resolution gas chromatography
HRMS	High resolution mass spectrometry
HRS	Hazard ranking system
HSL	Hazardous substance list (TAL + TCL)
HSWA	Hazardous and solid waste amendments
HTRW	Hazardous, toxic, and radioactive waste
HTRW-CX	Hazardous, Toxic, and Radioactive Waste - Center of Expertise
HVO	Halogenated volatile organics
IAG	Interagency agreement
IATA	International Air Transportation Association
IC	Ion chromatography
ICAO	International Civil Aviation Organization
ICAP	Inductively coupled argon plasma emission spectroscopy
ICB	Initial calibration blank
ICP	Inductively coupled plasma
ICP/MS	Inductively coupled plasma / mass spectrometer
ICS	Interference check standard
ICV	Initial calibration verification
ID	Identification
IDL	Instrument detection limit
IDW	Investigation-derived waste
IEC	Interelement correction standard
IEC	International Electrotechnical Commission
INPR	Inventory project report
IPR	Inventory project report
IR	Infrared radiation
IRP	Installation Restoration Program
IRPMIS	Installation Restoration Program Management Information System
IRIS	Integrated Risk Information System
ISE	Ion selective electrode
ISO	International Standards Organization
ITA	Innovative technology advocate
ITRC	Interstate Technology Regulatory Cooperation
IUPAC	International Union of Pure and Applied Chemistry
K-D	Kuderna-Danish
LAER	Lowest achievable emissions rate
LC	Liquid chromatography
LCL	Lower control limit
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
LDR	Land disposal restrictions (LANDBAN)
LDPE	Low density polyethylene
LFG	Landfill gas
LIBS	Laser-induced breakdown spectroscopy
LIF	Laser-induced fluorescence
LNAPL	Light, non-aqueous phase liquid
LNC	Laboratory notification checklist

LIMS	Laboratory information management system
LLE	Liquid-liquid extraction
LLW	Low level waste (radioactive)
LOD	Limit of detection
LOQ	Limit of quantitation
LQMP	Laboratory Quality Management Plan
LSE	Liquid-solid extraction
LUST	Leaking underground storage tank
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MB	Method blank
MCAWW	Methods for Chemical Analysis of Water and Wastes
MCL	Maximum contaminant level
MCLG	Maximum contaminant level goal
MCS	Media cleanup standards
MD	Matrix duplicate
MDL	Method detection limit
MDRD	Minimum detectable relative difference
MEK	Methyl ethyl ketone (2-butanone)
MFR	Memorandum for record
mg/Kg	Milligram per kilogram
MOA	Memorandum of agreement
MOU	Memorandum of understanding
MPS	Multi-port sampler
SQL	Method quantitation limit
MQO	Measurement quality objective
MRL	Method reporting limit
MS	Mass spectrometer
MS	Matrix spike
MSA	Method of standard additions
MSC	Major subordinate commands
MSD	Matrix spike duplicate
MSDS	Material safety data sheet
MSL	Mean sea level
MSW	Municipal solid waste
MW	Molecular weight
MW	Monitoring well
MWIP	Monitoring well installation plan
NA	North America
NA	Not applicable
NAAQS	National ambient air quality standards
NAPL	Non-aqueous phase liquid
NAS	Network analysis system
NBS	National Bureau of Standards
NCP	National Contingency Plan
NERL-LV	EPA National Environmental Research Laboratory - Las Vegas
ND	Non-detect
NEIC	National Enforcement Investigations Center (EPA)
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants

NFA	No further action
NHPA	National Historic Preservation Act
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Technology (formerly NBS)
NOI	Notice of intent
NOIBN	Not otherwise indicated by name
NOS	Not otherwise specified
NOV	Notice of Violation
NPD	Nitrogen - phosphorus detector
NPDES	National Pollutant Discharge Elimination System
NPDWR	National Pollution Drinking Water Regulation
NPL	National Priorities List
NPS	Non-point source
NRC	Nuclear Regulatory Commission
NRC	National Response Center
NSPS	National source performance standards
NT	Nitrotoluene
NTU	Nephelometric turbidity unit
NWS	National weather station (service)

OAC	Other areas of concern
O & M	Operations and maintenance
OB/OD	Open burning / open detonation
OCE	Office of Chief of Engineers
OERR	EPA Office of Emergency and Remedial Response
OEW	Ordnance and explosive waste
OMB	Office of Management and Budget
OMSQA	Office of Monitoring Systems and Quality Assurance
ORP	Oxidation-reduction potential
OSC	On-scene coordinator
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OTA	Office of Technology and Assessment
OU	Operable unit
OVA	Organic vapor analyzer
PA	Performance audit
PA/SI	Preliminary Assessment/Site Inspection
PAC	Powdered activated carbon
PAH	Polynuclear aromatic hydrocarbon
PARCCS	Precision, accuracy, representativeness, comparability, completeness, and sensitivity
PAT	Proficiency analytical testing
PAWS	Portable acoustic wave sensor system
PB	Preparation blank
PBMS	Performance based measurement system
PC	Polycarbonate
PCB	Polychlorinated biphenyl
PCP	Pentachlorophenol
PDS	Post digestion spike

PE	Performance evaluation
PE	Professional engineer
PF	Protection factor
PG	Professional geologist
PG	Packing group
PID	Photoionization detector
PM	Particulate matter
PM	Project manager
PNA	Polynuclear aromatic (hydrocarbons)
POC	Purgeable organic carbon
POC	Point of contact
POHC	Principal organic hazardous constituent
POL	Petroleum, oils, and lubricants
POTW	Publicly-owned treatment works
POX	Purgeable organic halides
ppb	Parts per billion (e.g., : g/L or : g/Kg)
PPE	Personal protection equipment
ppm	Parts per million (e.g., mg/L or mg/Kg)
ppt	Parts per trillion
PRG	Preliminary remediation goal
PQL	Practical quantitation limit
PRP	Potentially responsible party
PSI	Per square inch
PSN	Proper shipping name
PSR	Particle size reduction
PSS	Particle size separation
PT	Purge and trap
PTFE	Polytetrafluoroethylene
PUF	Poly urethane foam
PVC	Polyvinyl chloride
QA	Quality assurance
QAMS	Quality assurance management systems
QAMS	Quality assurance management staff
QAPP	Quality Assurance Project Plan
QC	Quality control
QCR	Quality Control Report
QCSR	Quality Control Summary Report
QL	Quantitation limit
RA	Remedial action
RAS	Routine analytical services
RC	Remedial construction
RCRA	Resource Conservation Recovery Act
RD	Remedial design
RDX	Cyclo-1,3,5-trimethylene-2,4,6-trinitramine (Royal demolition explosive)
RF	Response factor
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI/FS	Remedial Investigation/Feasibility Study

RL	Reporting limit
RMCL	Recommended maximum contaminant level
ROD	Record of decision
ROE	Right of entry
RPD	Relative percent difference
RPM	Remedial project manager
RQ	Reportable quantities
RRT	Relative retention time
RSD	Relative standard deviation
RSE	Relative standard error
S & A	Supervision and administration
SACM	Superfund Accelerated Cleanup Model
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SAS	Special analytical services
SAW	Surface acoustic wave array detector
SCAPS	Site characterization and analysis penetrometer system
SD	Standard deviation
SD	Serial dilution
SDWA	Safe Drinking Water Act
SGS	Soil gas survey
SI	Site investigation
SIP	State Implementation Plan
SITE	Superfund innovative technology evaluation
SMCL	Secondary maximum contaminant level
SMF	Sporadic marginal failure
SOC	Synthetic organic compound
SOP	Standard operating procedures
SOW	Scope of work
SPCC	System performance check compound
SPMD	Semi-permeable membrane device
SPE	Solid phase extraction
SPP	Sample preparation procedure
SQG	Small quantity generator
SQL	Sample quantitation limit
SRM	Standard reference material
SSHP	Site safety and health plan
SV	Sampling visit
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
SW-846	Test Methods for Evaluating Solid Waste-Physical/Chemical Methods analytical protocols
SWDA	Solid Waste Disposal Act
SWMU	Solid Waste Management Unit
TAL	Target analyte list (CLP inorganics)
TAP	Toxic air pollutant
TAT	Technical assistance team
TB	Trip blank
TBC	To be considered
TBT	Tributyl tin

TCDD	Tetrachlorodibenzodioxin
TCDF	Tetrachlorodibenzofuran
TCE	Trichloroethylene
TCL	Target compound list (CLP organics)
TCLP	Toxicity characteristic leaching procedure
TDS	Total dissolved solids
TERC	Total environmental restoration contract
THM	Trihalomethane
TIC	Tentatively identified compound
TIO	EPA Technology Innovation Office
TLC	Thin layer chromatography
TM	Technical manager
TNT	Trinitrotoluene
TO	Toxic organics
TOC	Total organic carbon
TOX	Total organic halides
TPH	Total petroleum hydrocarbons
TPP	Technical project planning
TRPH	Total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, disposal (facility)
TSP	Total suspended particulates
TSS	Total suspended solids
TSWP	Treatability Study Work Plan
TTN	Technology transfer network
UIC	Underground injection control
UCL	Upper control limit
UN	United Nations
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	Underground storage tank
UV	Ultraviolet
UXO	Unexploded explosive ordnance
VES	Vapor Extraction System
VOA	Volatile organic analysis (analyte)
VOC	Volatile organic compounds
VP	Vapor pressure
VSI	Visual site inspection
WP	White phosphorus
WQC	Water quality criteria
XRF	X-ray fluorescence
ZHE	Zero headspace extractor (TCLP VOCs)

Terms

Accuracy: the closeness of agreement between the measured value and the true value. Calculated as percent recovery.

Activity: an all-inclusive term describing a set of operations or related tasks to be performed, either serially or in parallel, that result in a total product or service.

Aliquot: a measured portion of a sample taken for analysis (USEPA CLP Statement of Work).

Analyte: a discrete chemical component of a sample to be identified and/or measured through analysis.

Anion: a negatively charged ion.

Aquifer: a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

Aromatic: relating to the six-carbon-ring configuration of benzene and its derivatives.

Audit: an independent, systematic examination to determine whether activities are effective and comply with planned arrangements, and whether the results are suitable to achieve objectives.

Background concentrations or levels: average presence in the environment (USEPA). Concentrations of contaminants detected in environmental samples from various media on the site or in the area of the site that have not been affected by site operations. These concentrations may reflect the natural occurrence of elements, as in the case of metals in soil. They may also reflect the widespread presence of compounds resulting from a variety of industrial and commercial activities, as in the case of PAHs in surface soils in urban areas.

- @ Regional background concentrations--usually apply to soil and reference data from a resource such as Shacklette and Boerngen (1984).
- @ Site-specific background concentrations--reference actual samples collected on the site or in the area of the site. Examples of such samples are ground water samples from a monitoring well upgradient of the site or surface soil samples from an area that has not been affected by onsite operations.

Bar Graph Spectrum: a plot of the mass-to-charge ratio (m/e) versus relative intensity of the ion current.

Batch (preparatory): batch is the basic unit for quality control implementation. The batch is defined as a group of #20, similar matrix samples and all of the required quality control samples that are analyzed together following the same method sequence, with the same manipulations, using the same reagents, during the same time period.

Bias: the systemic or persistent distortion of a measurement process that causes errors in one direction.

Boring: a cylindrical hole advanced into the ground, usually made by drilling.

Bottle Blank: analyte-free (deionized) water transferred to the appropriate sample bottles in the field and submitted for analysis. Results assess the potential incidental (airborne) contamination and cross-contamination due to the sample bottles and preservatives.

4-Bromofluorobenzene (BFB): a compound chosen to establish mass spectral instrument performance for volatile analysis.

Calibration: determination of the ratio of instrument response to analyte concentration. Established by the analysis of standards containing analytes of interest at known concentrations.

Calibration Check Compounds (CCC): term used in conjunction with Method 8260 (EPA/SW-846) to refer to the compounds in which the percent relative standard deviation is evaluated against method-prescribed criteria to decide the validity of a calibration.

Calibration Standards (CAL): a set of solutions prepared from the primary standards solution with the internal standards and surrogate analytes as appropriate, used to calibrate the instrument response with respect to analyte concentration.

Cation: a positively charged ion.

CERCLA/SARA: the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986. The acronym CERCLA is frequently used to refer to both acts, as is the term Superfund. CERCLA requires the administrator of the USEPA to promulgate regulations (see NCP) designating hazardous substances that, when released into the environment, may present substantial danger to public health, welfare, or the environment. The act established the Superfund and required the promulgation of regulations governing the funding and cleanup of waste sites and contaminated areas. CERCLA is the act that establishes legislative authority, while the National Oil and Hazardous Substances Contingency Plan (NCP) is the regulation that implements the requirements of CERCLA.

Chain of Custody: an unbroken trail of accountability that ensures the physical security of samples, data, and records.

Characteristic: any property or attribute of a datum, item, process, or service that is distinct, describable, or measurable.

Chemical Analysis: any of a variety of laboratory methods used to evaluate the concentrations of compounds and elements present in an environmental sample.

Cleanup Goals/Cleanup Standards/Cleanup Levels/Cleanup Criteria/Remediation Goals/Action Levels: for consistency, the following program usage is suggested:

- @ Action levels--to refer to the presence of a contaminant concentration in the environment high enough to warrant action or trigger a response under CERCLA or the National Oil and Hazardous Substances Contingency Plan (USEPA).

Cleanup/Remediation/Remedial Action/Removal/Removal Action: for consistency, the following program usage is suggested:

- @ Remedial action--refers to all activities, except long-term operation and maintenance, associated with permanent correction or remedy of contamination at or in the area of a site.
- @ Removal action--refers to limited or short-term measures intended to mitigate the immediate effects of or prevent the release of hazardous substances into the environment (specifically, source removal).
- @ Cleanup or remediation--refers to all activities, including long-term operation and maintenance, associated with permanent correction or remedy of contamination at or in the area of a site.

Comparability: a qualitative characteristic that defines the extent to which the data for a chemical parameter measurement are consistent with, and may be compared with, data from other sampling events.

Compatibility: the ability of materials (and/or wastes) to coexist without adverse effects.

Completeness: a quantitative evaluation of what percent of the chemical measurements (results) are successfully accomplished.

Composite Sample: portions of material collected from more than one spatial location or at different times that are blended and submitted for chemical analyses. Composite samples can provide data representative of a large area with relatively few samples. However, the resulting data are less accurate with regard to the concentrations of contaminants detected in a specific location, because they represent average values.

Compound: a substance composed of two or more elements existing in combination. Each compound may be expressed by a chemical formula.

Continuing Calibration Verification Standard (CCV): a midconcentration analytical standard run periodically to verify the calibration of the analytical instrument is valid.

Continuous Barrel Sampler: a 1.5-m- (5-ft-) long split barrel sampler used to collect representative samples of soil or soft rock. The sampler consists of five parts: a cutting shoe at the bottom, a barrel consisting of a length of pipe split longitudinally into two halves, a sample catcher, and a coupling at the top for connection to the drill rods.

Contract Laboratory Program (CLP): a nationwide laboratory network established by the USEPA, structured to provide legally defensible analytical results to support USEPA enforcement actions or other requirements of the user community. The CLP incorporates a level of quality assurance appropriately designed for the intended usage of the data.

Contractor Chemical Quality Control: a three-phase control process (preparatory, initial, and follow-up) that is performed onsite by the contractor to ensure that quality is maintained throughout all field work.

Corrective Action: measures taken to rectify conditions adverse to quality and where possible, to preclude their recurrence.

Data Assessment: the all-inclusive process used to measure the effectiveness of a particular data-gathering activity. This process may comprise data verification, data review, data evaluation, and data validation.

Data Evaluation: The process of data assessment done by USACE District project chemist to produce a Contractor Data Quality Assessment Report. Refer to EM 200-1-6.

Data Quality Indicators (DQI): measurable attributes for the attainment of necessary quality to support an environmental decision. DQIs include precision, bias, completeness, representativeness, reproducibility, comparability, sensitivity, and statistical confidence.

Data Quality Objectives: qualitative and quantitative statements that clarify technical and quality objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for decisions.

Data Review: an evaluation of laboratory data quality based on a review of method-specific quality control documentation. Method-specific quality control documentation requirements are specified in the project-specific laboratory subcontract.

Data Validation: an evaluation of laboratory data quality based on a review of the data deliverables. This process involves procedures verifying instrument calibration, calibration verification, and other method-specific performance criterion.

Data Verification: the process for evaluating the completeness, correctness, consistency, and compliance of a data package against a standard or contract.

Decontamination: cleaning of personnel, equipment, structural materials, etc., using any of a variety of technologies. The most commonly used technologies are washing, using soap and water and/or various acidic rinses or solvents, etc.; and steam cleaning. This term applies both to cleaning of personnel and equipment following site investigation and remediation activities and to cleaning of contaminated structures or structural materials as part of a removal or remedial action.

Deficiency: an unauthorized deviation from approved procedures or practices, or a defect in an item.

Definitive Data: data that are generated using rigorous, analyte-specific analytical methods where analyte identification and quantitations are confirmed and quality assurance/quality control requirements are satisfied.

Detection Limit: the minimum concentration of an analyte that can be measured within a given matrix and reported with a 99 percent confidence that the analyte concentration is greater than zero.

Discrete Sample: a portion of material collected from a unique spatial location and submitted for chemical analyses. Discrete samples are collected when it is necessary to identify and quantify contamination at a specific location and time.

Disposal: final placement or destruction of wastes. Disposal may be accomplished through the use of landfills, treatment processes, etc.

Dissolved Metals: the concentration of metals determined in a sample that will pass through a 0.45- μm or appropriately sized filter. The sample is filtered, and the filtrate is preserved (acidified) in the field, transported to the laboratory, and then analyzed following appropriate methodologies.

Duplicate: see Matrix Duplicate.

Environmental Sampling: collection of samples from a particular media for the purpose of obtaining chemical analyses.

Equipment Rinsate Blank/Field Equipment Blank/Rinsate Blank/Equipment Blank: samples of clean, analyte-free water passed through and over the sampling equipment. These blanks permit evaluation of equipment decontamination procedures and potential cross-contamination of environmental samples between sampling locations. An equipment rinsate blank is typically obtained from each type of sampling tool used to collect environmental samples.

Extractable Organics: semivolatiles (base/neutral and acid-extractable compounds) and pesticide/polychlorinated biphenyl compounds that can be partitioned into an organic solvent from the sample matrix and are amenable to gas chromatography.

Feasibility Study (FS): a description and analysis of the potential cleanup alternatives for a hazardous waste site. Cleanup alternatives are broadly evaluated on the basis of effectiveness, implementability, and cost. The USEPA “Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA” specifies nine detailed evaluation criteria (EPA/540/G-89/004).

Field Blank: a general term used to describe various blanks, including bottle blanks, equipment blanks, media blanks, trip blanks, etc.

Field Control Samples: general term assigned to field-generated quality assurance/quality control samples, such as replicates (duplicates/splits/spikes), blanks, background/upgradient samples, etc.

Field Duplicate Sample: independent sample collected at approximately the same time and place, using the same methods as another sample. The duplicate and original samples are containerized, handled, and analyzed in an identical manner.

Field Investigation: any investigation conducted at a site or in the area of a site for the purpose of site characterization. A field investigation may or may not be part of a remedial investigation or remedial action. It may include geophysical surveys, ground surveys, well surveys, environmental sampling, etc.

Field Replicate: a general term for field duplicates/triplicates, field splits, or field spikes. Samples may be homogenized prior to splitting into replicate samples. Each replicate is containerized, handled, and analyzed in an identical manner. Used to evaluate the precision of handling, shipping, storage, preparation, and analysis.

Filtrate: a filtered liquid.

Filtration: the physical removal of solid particles from a liquid waste stream by passing the liquid across a filter medium, which serves as a barrier to the solid material.

Field Sampling Plan (FSP): the portion of the Sampling Analysis Plan that defines the field activities; includes all requirements for sampling, field documentation, onsite chemical analysis, sample packaging and shipping, etc.

Gas Chromatography: A process in which the components of a mixture are separated from one another by volatilizing the sample mixture into a carrier gas stream that is passing through and over a bed of packing solid support. Different components move through at different rates depending on their size and affinity toward the solid support. Elution from the column occurs at different rates to the various detectors where the components are measured based on thermal conductivity changes, density differences, or ionization

detectors. The primary components of a gas chromatograph include injection port, column, integrator/data system, and detectors.

Gas Chromatography/Mass Spectroscopy (GC/MS): two distinct analytical techniques used to separate and identify organic compounds: the GC is used for the separating portion and the MS is used as the detection portion of an analysis. Both techniques are typically performed by a single instrument.

Grab Sample: an individual sample collected from a single location at a specific time. Samples are collected and placed in the appropriate sample containers with no mixing.

Hazardous/Nonhazardous: the following terms are correct:

- @ Hazardous waste (RCRA)--as defined in 40 CFR 261, byproducts of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Refers to both wastes listed in the referenced section and wastes demonstrating any of the four hazardous characteristics (ignitability, corrosivity, reactivity, and toxicity) identified in the referenced section.
- @ Hazardous substance (CERCLA)--encompasses not only RCRA hazardous wastes, but also includes substances and pollutants listed under the Clean Water Act; hazardous air pollutants listed under the Clean Air Act; any substance with respect to which the USEPA has taken action under the Toxic Substances Control Act; and elements, compounds, mixtures, solutions, and substances (to be identified by the USEPA under CERCLA) which, when released into the environment, may present substantial danger to the public welfare or the environment.
- @ Hazardous material (Department of Transportation)--refers to materials contaminated by any substance that is listed in the appendix to 49 CFR 172.101 and that exceeds the reportable quantity criteria identified in this appendix.
- @ Nonhazardous--if used, clarify whether it is used as the opposite of one or all of these terms, or whether it refers to the absence of toxic characteristics as defined by risk assessment techniques, etc.

Heavy Metals: in reference to environmental sampling, typically identified as the following trace inorganics: cadmium, lead, mercury, silver, etc. (all metals of health concern). Heavy metals can cause biological damage if consumed at low concentrations and tend to accumulate in the food chain.

Heterogeneous: the quality of containing dissimilar parts within the composition of the media.

High-Performance Liquid Chromatography (HPLC): an analytical technique used for separating and identifying compounds not amenable to gas chromatography.

Homogeneous: the quality of uniform composition.

Homogenized Sample: a sample collected from a single location at a specific time, but mixed to ensure representativeness prior to containerizing. This technique is not suitable for volatile organic samples.

Hydrogeologic Investigation: a systematic study of the interrelationships that exist between geology and the associated ground and surface water.

Hydrogeology: the study of the interrelationships of geologic materials and processes with water, especially groundwater.

Hydrology: the study of the occurrence, distribution, and chemistry of all waters of the earth.

Infiltration: the penetration of water through the ground surface into subsurface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls.

Initial (Continuing) Calibration Blank (ICB/CCB): a volume of ASTM D 1193 Type II (polished) water prepared in the same manner as standards used to flush the analytical system.

Initial (Continuing) Calibration Verification Standard (also instrument check standard) (ICV/CCV): a USEPA-certified multielement standard or independently prepared multielement standard solution used to verify the accuracy of the initial calibration. This standard prepares all elements at solutions of known concentrations equivalent to the midpoint of their respective calibration curves and must be run at each wavelength used in the inductively coupled plasma analysis.

Inorganic Chemicals: chemical substances of mineral origin, not of basically carbon structure.

Interference (Interelement) Check Standard (ICS or IEC): a solution containing both interfering and analyte elements of known concentrations used to verify background and/or interelement interferences, so that appropriate correction factors are utilized to compensate.

Internal Standards (IS): Compounds added to every standard, blank, sample, matrix duplicate, matrix spike, matrix spike duplicate, etc., at a known concentration, prior to analysis by GC or GC/MS when using internal standard calibration and quantitation techniques. Internal standards are used as the basis for quantitation of the target compounds.

Laboratory Control Sample (LCS): also referred to as a QC (Reference) Sample. A spiked blank sample prepared with each preparatory batch from the primary or an independent source, which combines a portion, or all of the elements being analyzed for calculation of precision and accuracy to verify that analysis is being performed in control.

Laboratory Duplicate Samples: identical splits of individual samples that are taken and analyzed by the laboratory to assess method reproducibility.

Laboratory Fortified Blank (LFB): a term used in conjunction with EPA/600/4-88/039 method 524.2, which describes an aliquot of reagent water to which known quantities of the method analytes are added in the laboratory. The LFB is similar to an aqueous LCS.

(m/z): mass-to-charge ratio. Synonymous with (m/e).

Matrix: the material of which the sample to be analyzed is composed. Typically, refers to water, soil/sediment, or other environmental medium. "Matrix" is NOT synonymous with "phase" (liquid or solid).

Matrix Duplicate/Laboratory Duplicate (DUP): two representative aliquots of the same sample matrix subjected to identical analytical procedures in order to assess the procedural precision of the method through the calculation of relative percent difference (%RPD).

Matrix Spike (MS): also referred to as a Laboratory Fortified Sample Matrix (LFM). An aliquot of sample matrix (soil or water) fortified with known quantities of specific compounds and subjected to the entire analytical procedure in order to assess the appropriateness of the method to the matrix through calculation of the percent recovery, or other accuracy term.

Matrix Spike Duplicate (MSD): a second aliquot of the same matrix as the matrix spike that is fortified also in order to determine the precision of the method.

Medium/Media: refers to the basic material composing an environmental sample or an environment of regulatory concern, i.e., water, soil, or air. “Medium” is singular; “media” is plural. This term derives from the conventional definition: “the element (earth, water, air, or fire) that is the natural habitat of an organism.”

Method: a body of procedures and techniques for performing an activity systematically presented in the order in which they are to be executed.

Method Blank (MB): also known as Reagent Blank (RB), or Laboratory Reagent Blank (LRB). A volume of ASTM D 1193 Type II (polished) water prepared in the same manner as samples. This sample is used to evaluate if cross- contamination or any memory effects are present.

Method Detection Limit (MDL): minimum concentration of a substance that can be measured and reported.

Method of Standard Additions (MSA): the method of standard addition may be required to compensate for matrix effects. This technique should not be used for interferences that cause baseline shift. The standard-addition technique involves the analysis of the unknown sample and unknown plus known amounts of standard with extrapolation of this internal calibration curve to the baseline.

: g/kg: a unit describing the concentration of substances within the mass of a solid medium (weight) (ppb = parts per billion).

: g/L: a unit describing the concentration of substances within the volume of a liquid medium (ppb = parts per billion).

mg (milligram): unit of measure for mass (weight) (1,000 mg = gram).

mg/kg: a unit describing the concentration of substances within the mass of a solid medium (weight) (ppm = parts per million).

mg/L: a unit describing the concentration of substances within the volume of a liquid medium (ppm = parts per million).

mg/m³: a unit describing the concentrations of dusts, gases, and mists in a measured amount of air.

Mixed Waste: waste material containing hazardous chemical and radioactive constituents.

Multimedia: containing or involving more than one medium.

National Oil and Hazardous Substances Contingency Plan (NCP): this is the rule that implements the regulatory requirements of CERCLA and SARA. It guides the determination of the sites to be corrected

under the Superfund program and the program to prevent or control spills into surface waters or other portions of the environment.

National Priority List (NPL): the USEPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. USEPA is required to update the NPL at least once a year.

Negative Pressure: indirect pressure applied to the liquid (or gas) in the form of a vacuum drawing the liquid through a filter membrane.

Onsite/Offsite:

@ Onsite--within the site boundaries.

@ Offsite--outside the site boundaries.

Organic: (1) referring to or derived from living organisms. (2) In chemistry, any compound containing organic carbon.

pH: a numerical designation of relative acidity or basicity (alkalinity). A pH of 7 indicates neutrality; lower values indicate increasing acidity; higher values indicate increasing alkalinity.

Physical Soil Analysis: an analysis used to determine the physical and engineering properties of a soil. Possible analyses may include particle size, dry weight, Atterberg limits, pH, redox potential, mineral class, organic carbon and clay content, density, soil porosity, compaction, and consolidation.

Positive Pressure: pressure that is applied directly on a liquid, forcing it through the filter membrane.

Practical Quantitation Limit (PQL): minimum concentration of a substance that can be reported based upon the analysis of a project-specific matrix.

Precision: agreement among the results from a set of duplicate analysis, regardless of the true value.

Preservation: methods used to retard degradation of chemical analytes within samples by inhibiting decomposition by biological action and chemical reactions, and reducing sorption effects. Methods include limiting headspace; chemical, acid, or base addition; protection from light, cooling, etc.

Professional Judgement: the ability of a single person or team to draw conclusions, give opinions, and make interpretations based on measurement results, knowledge, experience, literature, and other sources of information.

Purge-and-Trap Device: analytical technique used to isolate volatile (purgeable) organics by stripping the compounds from water or soil slurry by a stream of inert gas, trapping the compounds on an adsorbent such as a porous polymer trap, and thermally desorbing the trapped compounds onto a gas chromatographic column.

Purging: removing stagnant water from a well that may bias the representativeness of the samples. Purge volume usually varies between three and five times the volume of the well.

QA Laboratory: the USACE Division or referee laboratory responsible for the analyses of the project QA (split) samples.

QA Sample/Split: a sample that is a collocated or homogenized replicate of a field sample, except that the sample is sent to the Government QA or referee laboratory for analysis. Sample receipt allows early detection of sampling, documentation, packaging, and/or shipping errors. Data comparison to contractor's data allows an assessment of primary laboratory's performance.

Quality: the totality of features and characteristics of a product or service that bear on its ability to meet the stated or implied needs and expectations of the user.

Quality Assurance (QA): an integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement that measures the degree of excellence of environmental data and communicates the information to a data generator or data user in a convincing manner.

Quality Assurance Project Plan (QAPP): the portion of the SAP that defines the laboratory analytical and chemical data reporting requirements.

Quality Assurance/Quality Control (QA/QC): a system of procedures, checks, audits, and corrective actions to ensure that all research, design, performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality (EPA).

QC Reference Standard: refer to LCS.

QC Sample: a field replicate (duplicate) sent blindly to the Contractor's (primary) laboratory. Results assess the sampling precision and handling techniques.

Quality Control (QC): the overall system of technical activities that monitor the degree of excellence of environmental data so that stated standards or requirements are achieved.

Quantitation Limit (QL): the minimum concentration of an analyte in a specific matrix that can be identified and quantified within specified limits of accuracy or precision.

Redox: oxidation-reduction potential.

Relative Percent Difference (RPD): calculation used to compare two values and assess against method precision criteria. Refer to Appendix I for further information.

(Relative) Response Factor (RF/RRF): a measure of the relative mass spectral response of an analyte compared to its internal standard. RF/RRF are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples. RF/RRF is calculated from the following equation:

$$RF = \frac{(A_x C_{IS})}{(A_{IS} C_x)}$$

where:

A_x = area of the characteristic ion for the compound being measured

C_{IS} = concentration of the specific internal standard

A_{IS} = area of the characteristic ion for the specific internal standard

C_x = concentration of the compound being measured

Release: any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment excluding any release that results in exposure to persons solely within a workplace; emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine; and release of source, byproduct, or special nuclear material from a nuclear incident (NCP).

Remedial Design (RD): the technical analysis and procedures that follow the selection of remedy for a site and result in a detailed set of plans and specifications for implementation of the remedial action (NCP).

Remedial Investigation (RI): a process undertaken to determine the nature and extent of the problem presented by the release of hazardous substances into the environment (EPA). The RI includes sampling and monitoring and gathering sufficient information to establish cleanup criteria to determine the necessity for remedial action and to support the evaluation of remedial alternatives. The RI process is usually considered to encompass obtaining resources required for the field investigation, the field investigation itself, and the RI report.

Reporting Limit: the project-specific threshold limit established for a project for which, below a numerical value, the data are reported as nondetect (U) and presented as less than (<) a numerical value.

Representativeness: a qualitative measure of the extent to which a sample(s) acquired from a medium describe the chemical characteristics of that medium.

Reproducibility: the precision, usually expressed as variance, measures the variability among the results from replicates analysis.

Residual: pertaining to a residue or remainder, as in “residual contaminations.” Amount of pollutant remaining in the environment after a natural or technological process has taken place, for example, the sludge remaining after initial wastewater treatment or particulates remaining in air after the air passes through a scrubbing or other pollutant removal process.

Resolution: also known as separation, or percent resolution. The separation between peaks on a chromatogram, calculated by dividing the depth of the valley between the peaks by the peak height of the smallest peak being resolved, and multiplied by 100. Method criteria for peak resolution may be established based on peak tailing factors (Figure I-1), but is normally evaluated based on analyst judgement.

Resource Conservation and Recovery Act (RCRA): refers to the Solid Waste Disposal Act as amended by RCRA. This act includes regulations governing solid wastes, which include hazardous wastes as defined under RCRA. The RCRA hazardous regulations govern all aspects of hazardous waste management

including identification and listing of hazardous wastes and standards applicable to generators; transporters; and owners of treatment, storage, and disposal facilities.

RI-derived Waste: any wastes generated during remedial investigation activities that may have come in contact with contaminated media at the site. These wastes usually include drilling cuttings, well development or purging water, personnel protective clothing, disposable sampling equipment, any decontamination wastes, or plastic used to collect cuttings.

Risk Assessment: qualitative and quantitative evaluation performed to define the risk posed to human health and/or the environment by the presence of specific pollutants.

Sample: a portion of material collected for chemical analyses. Note that a sample is identified by a unique sample number and that the term and the number may apply to multiple sample containers, if a single sample is submitted for a variety of chemical analyses.

Sampling and Analysis Plan (SAP): a submittal document comprised of the FSP and QAPP; used to define all aspects of the project sampling and analytical work to be done.

Screening Data: data generated by less precise methods of analysis, less rigorous sample preparation, or less stringent QA/QC procedures. The data generated provide analyte identification and quantitation, although either may be relatively imprecise.

Sediment: solid material settled from suspension in a liquid.

Semivolatile Organics: compounds that are amenable to analysis by extraction of the sample with an organic solvent. The term semivolatile organic is used synonymously with base/neutral/acid (BNA) compounds.

Sensitivity: a general term used to describe contract method detection/quantitation/reporting limits established to meet project-specific data quality objectives, or the capability of a method or instrument to discriminate between small differences in analyte concentration.

Serial Dilution: when a new or unusual matrix is encountered, a series of tests is recommended prior to release of results to verify that no matrix effects are occurring. The method recommends serial (1:4) dilution be run on samples with concentrations at least >10X instrument detection limit, with results agreeing within ± 10 percent of the original determination.

Sludge: any heavy, slimy deposit, sediment, or mass.

Slug Test: an aquifer test conducted by causing an instantaneous change in the water level in a well. The recovery of the water level with time is measured.

Soil: a natural aggregate of mineral grains with or without organic materials that can be separated by mechanical means.

Solids: materials that tend to keep their form rather than to flow or spread out.

Split-spoon Sampler: open-ended cylindrical tool used to collect samples by driving or pushing them into the ground. Split-spoon samplers have inside diameters ranging from 3 to 6.3 cm (1-3/8 to 2-1/2 in.) and usually consist of five parts, similar to a continuous barrel sampler.

Standard Operating Procedures (SOP): a written document detailing the process for an operation, analysis, or task with thoroughly prescribed techniques and steps, and is officially approved as the acceptable method of performance.

Subsurface: below the land surface.

Subsurface Investigation: a systematic study of the physical and chemical properties of the geologic materials, groundwater, and any waste products present in the subsurface.

Subsurface Soil: soil that underlies the defined limit of surface soil. Distinction between surface soil and subsurface soil is valid only when referring to risk posed by exposure of surface biota to contamination.

Superfund: the program operated under the legislative authority of CERCLA and SARA that funds and carries out the USEPA solid waste emergency and long-term removal remedial activities. These activities include establishing the National Priority List, investigating sites for inclusion on the list, determining their priority level on the list, and conducting and/or supervising the ultimately determined cleanup and other remedial actions.

Surrogate Compounds: also referred to as System Monitoring Compounds (SMC). Brominated, fluorinated, or isotopically labeled compounds (not expected to be detected within environmental samples) which are added to EVERY blank, sample, MS, MSD, DUP, standard, etc., undergoing organic analyses in order to evaluate analytical efficiency by measuring recovery.

Suspended Metals: The concentration of metals determined in the portion of a sample that is retained on a 0.45- μ m filter. (The concentration of suspended metals may also be calculated from the difference between the total metals sample results minus the dissolved metals sample results.)

SW-846: a set of USEPA reference manuals containing specific methods/procedures for physical and chemical analyses (EPA/SW-846).

System Performance Check Compounds (SPCCs): term used in conjunction with SW-846 GC/MS methods to refer to the compounds in which the RF is evaluated against method-prescribed criteria to decide the validity of an analytical system.

Temperature Blank: a container filled with water packaged along with the field samples to allow the receiving laboratory a mechanism to accurately measure the temperature of the cooler and associated samples upon receipt. The samples do not undergo any chemical analysis.

Tentatively Identified Compounds (TICs): compounds detected in environmental samples that are not method target analytes, internal standards, or surrogates. Typically 10 to 20 of the largest unidentified peaks are subjected to a mass spectral library search for tentative identification. An additional charge may be associated with this procedure.

Thin-Wall Tube Sampler: a seamless steel tube with a diameter not less than 5 cm (2 in.) and an area ratio of about 10 percent. Common tubing used has a diameter of 5 or 7.5 cm (2 or 3 in.) and varies from 0.6 to 0.9 m (2 to 3 ft) long. The lower end of the tube is crimped to form a cutting edge. The upper end is attached to a coupling head. Thin-walled tubes are used in soft or moderately stiff cohesive soils to collect relatively undisturbed unconsolidated material.

Total Metals: concentration of metals determined in an unfiltered water sample that is preserved (acidified) in the field and transported to the laboratory, and then follows a rigorous digestion.

Total Recoverable Metals: concentration of metals in an unfiltered water sample that is preserved (acidified) in the field and transported to the laboratory, which then performs the digestion with hot dilute mineral acid. This preparation method is typically utilized for drinking water, solid environmental samples, and EPTox or toxicity characteristic leaching procedure extracts.

Traceability: the ability to trace history, application, or location of an entity by means of documentation and recorded identifications.

Trip Blank (TB): samples prepared by adding clean, analyte-free water to sample containers for aqueous volatile organics analysis. Preservatives are added to the blank, and the containers are sealed. Trip blanks are transported with empty sample containers to the site, and back to the laboratory with the environmental samples. TBs remain sealed until analyzed with the collected environmental samples. TBs permit evaluation of contamination generated from sample containers or occurring during the shipping and laboratory storage process.

Upgradient Sample: refers to background samples, with regard to upstream aqueous media (e.g., surface and ground waters).

Volatile Organics: compounds amenable to analysis by the purge-and-trap technique. The term volatile organics is used synonymously with purgeable compounds.

Wide-Bore Capillary Column: A gas chromatographic column with an internal diameter that is > 0.32 mm. Columns with lesser diameters are classified as narrow-bore capillary columns.